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IS 8252-10 (1979): Environmental tests for aircraft equipment, Part 10: Salt Mist [TED 14: Aircraft and Space Vehicles]

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IS : 8252 (Part X) - 1979

(Reaffirmed 2005)

Indian Standard

ENVIRONMENTAL TESTS FOR AIRCRAFT EQUIPMENT

PART X SALT MIST

Aircraft and Space Vehicles Sectional Committee, EDC 74; Environmental and Operating Conditions for Aircraft Equipment Subcommittee, EDC 74 : 4 [Ref : Doc : EDC 74 (2985)

1. Scope

1.1 This standard specifies tests to evaluate the ability of an equipment to operate and resist corrosion when occasionally exposed to a salt-contaminated atmosphere. It is not intended for the testing of equipment which is externally mounted or installed in zones at risk to heavy salt contaminations (for example, under carriage bays and intake ducts), in aircraft operating in close proximity to the sea and inland areas having a high salinity.

Note — The test requirements for equipment exposed to severe salt contamination conditions, for example, hovercraft, undercarriage bays, etc, shall be covered in a separate standard.

1.2 Two alternative test methods are defined and, although they are basically two different procedures, the two tests may be considered to achieve the same objectives. Both methods are accelerated tests involving a humidity and a self concentration whose combined effect may result in conditions that are more severe than those normally found in service. One or both of these alternative tests may be adopted.

2. Apparatus

2.1 The chamber used for the test, and all accessories, shall be made of material that will not affect the corrosiveness of the mist. Parts that come in contact with the test items shall not be of metal and shall not cause electrolytic corrosion. There shall be no direct impingement of sprayed solution or dripping of condensate upon the test items, but a mist shall be developed within the upper part of the test chamber by means of one or more atomizers dipping into the salt solution and supplied with compressed air. The air pressure shall be as low as practicable consistent with the development of a fine mist. The air shall be free from impurities and the atomizers themselves shall be non-reactive to the salt solution. Liquid that has been in contact with the test items shall not be returned to the reservoir of solution. Relief of pressure shall be provided from the chamber. A fresh supply of salt solution shall be used for each exposure period.

2.2 A suitable atomizer is shown in Fig. 1.

3. Test Conditions

3.1 The appropriate standard conditions stated in IS : 8252 (Part I) - 1976 ' Environmental tests for aircraft equipment: Part I General ' shall apply.

3.2 The equipment shall be subjected to the test in its normal mounting attitude, unless otherwise specified in the relevant equipment specification.

3.3 Unless otherwise required by the equipment specification, all connectors and covers shall be in position and all other seals made as for normal operation.

3.4 The equipment shall not be operated at any time during the test, unless this is specifically required by the equipment specification.

3.5 The test item shall be given a minimum of handling and shall be prepared for test immediately before exposure. Unless otherwise specified, uncoated metallic and metallic coated devices shall be thoroughly cleaned of oil, dirt and grease.

4. Test Methods

4.1 *Method 1*

4.1.1 *Salt solution* — The salt used shall be sodium chloride containing, on a dry basis, not more than 0·1 percent sodium iodide and not more than 0·5 percent of total impurities. Unless otherwise specified, the solution shall be a 5 ± 1 percent solution by mass, using distilled water.

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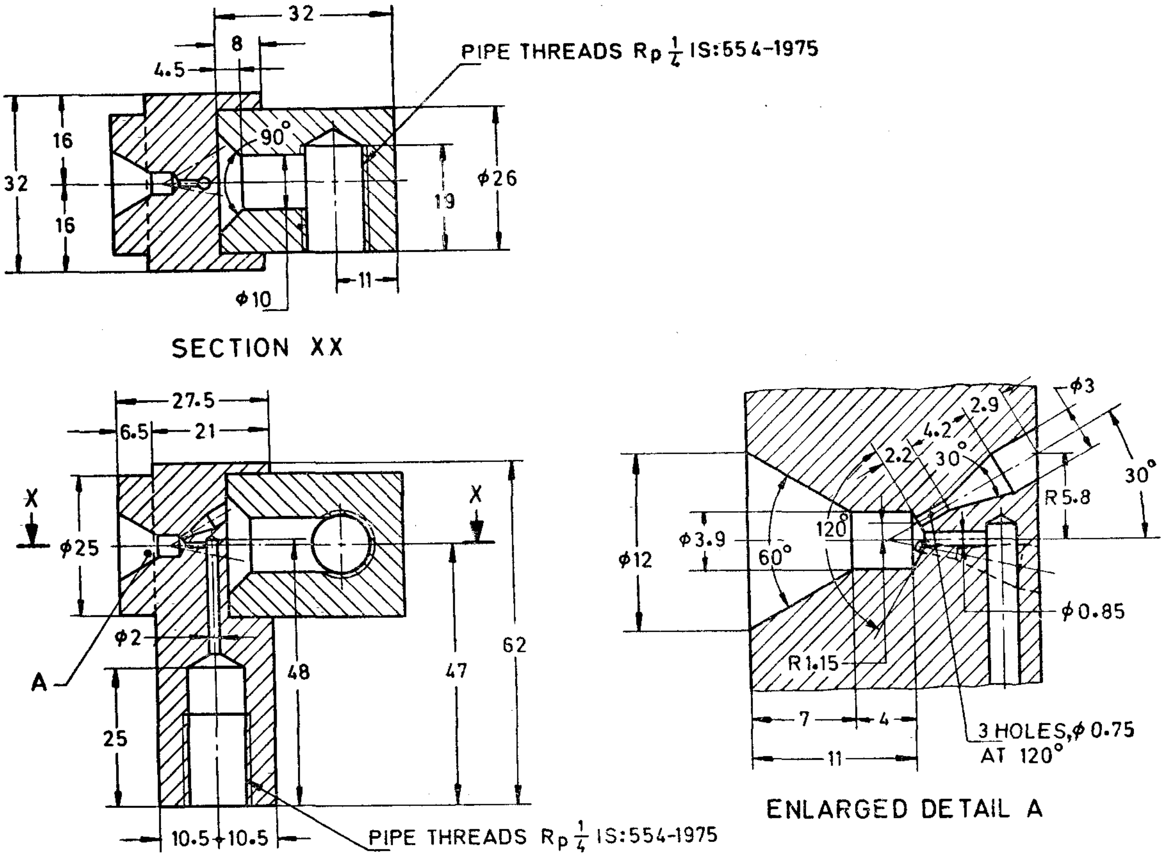

Note — The atomizer should be manufactured from corrosion resistant materials, for example, transparent plastics material.

All dimensions in millimetres.

FIG. 1 DETAILS OF SUITABLE ATOMIZER

The salt solution, atomized at 35 ± 2°C and collected as specified in 4.1.2, shall be maintained in the *p*H range 6·5 to 7·2. Only dilute chemically pure (CP) hydrochloric acid or CP sodium hydroxide shall be used to adjust the *p*H. The addition of sodium tetraborate (common borax) may be made in a ratio not exceeding 0·7 g to 80 litres of salt solution as a *p*H stabilizing agent.

4.1.2 *Procedure* — The equipment in the test chamber shall be conditioned to +35 ±3°C before spraying is commenced, and the temperature of the chamber and solution shall be maintained at +35 ±3°C throughout the spraying phase.

A salt mist shall be produced in the chamber of such a density that the quantity of precipitate, collected per hour in a clean receptacles placed in the test space, is equivalent to 2 ± 1 ml over 80 cm^2 of horizontal collecting area* averaged over at least 16 h†. A minimum of two receptacles shall be used, one placed close to a nozzle and the other farthest from all nozzles. The receptacles shall be so positioned that they are not shielded by the test items and no drops of solution from the test items or other sources will be collected.

4.1.2.1 Unless otherwise specified, the equipment shall be subjected to the mist conditioning for a period of 48 h.

4.1.3 *Examination* — On completion of the test the equipment shall be operated and its performance demonstrated as required by the relevant equipment specification.

It shall be examined for corrosion, deterioration, etc, and to aid examination a gentle wash in running water, at a temperature not exceeding 38°C, may be used if necessary, followed by a drying procedure of 48 h in a standard laboratory atmosphere or as required by the relevant equipment specification. The equipment specification may specify if the performance test is required to be carried after 48 h drying period.

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*Equivalent to a receptacle of 100 mm diameter.

†This concentration can be attained using a spray solution of approximately 12 l (3 quarts) per 1·0 m^3 of chamber volume per 24 h.

4.2 *Method 2*

4.2.1 *Solution* — A solution shall be prepared by dissolving the following salts in distilled water and making up to 1 litre:

Sodium chloride Nacl 26·5 g
Magnesium chloride $MgCl_2$ 2·4 g
Magnesium sulphate $MgSO_4$ 3·3 g
Calcium chloride $CaCl_2$ 1·1 g
Potassium chloride KCl 0·73 g
Sodium bicarbonate $NaHCO_3$ 0·20 g
Sodium bromide NaBr 0·28 g

The proportions of the ingredients in this solution shall be within 10 percent of those stated.

4.2.2 *Procedure* — The equipment shall be exposed to a salt mist for a period of 2 h at a chamber temperature of 20 ± 5°C, or as stated in the relevant equipment specification. The quantity of salt solution used during this period should be approximately 1 percent per hour of the test chamber volume, or as stated in the relevant equipment specification.

The equipment shall be stored at a relative humidity of 90 to 95 percent at a temperature within the range 35 ± 3°C for a period of 22 h.

The foregoing comprises a 24 h cycle. If a single chamber is used for this test a 3 h period at each change point of the cycle may be allowed for changing the temperature from that required for exposure to salt mist to that of storage, and *vice versa*.

4.2.2.1 This procedure shall be repeated until three complete cycles of exposure and storage have been completed.

4.2.3 *Examination* — On completion of the test the equipment shall be operated and its performance demonstrated as required by the relevant equipment specification.

It shall be examined for corrosion, deterioration, etc, and to aid examination a gentle wash in running water, at a temperature not exceeding 38°C, may be used if necessary, followed by a drying procedure of 48 h in a standard laboratory atmosphere or as required by the relevant equipment specification. The equipment specification may specify if the performance test is required to be carried after 48 h drying period.

Note — The relevant equipment specification shall require either of the above-mentioned two methods.

5. Information to be Stated in Relevant Equipment Specification — When a salt mist test is specified in the relevant equipment specification the following information shall be stated, as far as applicable:

	Relevant clause
a) Mounting attitude if other than normal	3.2
b) Fitting of connectors, covers, etc, if other than normal	3.3
c) Operation requirement during test	3.4
d) Cleaning prior to test	3.5
e) Test method (either 1 or 2)	4.1 and 4.2
f) Method 1 — composition of salt solution if other than 5 percent solution	4.1.1
g) Method 1 — spray period if other than 48 h	4.1.2.1
h) Method 2 — spray concentration if other than 1 percent	4.2.2
j) Examination and performance requirements	4.1.3 (Method 1) and 4.2.3 (Method 2)

EXPLANATORY NOTE

This standard is one of the series of Indian Standards relating to the environmental and operating conditions for aircraft equipment. The scope and applicability of these standards is outlined in IS : 8252 (Part I) - 1976 ' Environmental tests for aircraft equipment: Part I General '.

This standard is based on ISO/DIS 2659 Environmental tests for aircraft equipment — Part 2.9 : Salt mist prepared by International Organization for Standardization.

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